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### NOTE:

Descriptions herein contained may be subject to improvement changes without notice.

### INTRODUCTION TO THE OWNER'S MANUAL

SEGA ENTERPRISES, LTD., supported by its high electronic technology of LSI's, microprocessors, etc. and a wealth of experience, has for more than 30 years been supplying various innovative and popular game machines to the world market. This OWNER'S manual is intended to provide detailed comments together with all the necessary information covering the operation in general of electronic assemblies, electromechanicals, servicing control, spare parts, etc. as regards the AFTER BURNER U/R, a new SEGA product. The manual is intended for those who have knowledge of electricity and technical expertise especially in ICs, CRTs, microprocessors, etc. Carefully read so as to acquire sufficient knowledge before working on the machine. Should there be a malfunction, non-technical personnel should under no circumstance touch the interior system.

#### 1. HANDLING PRECAUTIONS

When installing or inspecting, be very careful of the following points and pay attention to ensure that the player can enjoy the game safely:

- o Be sure to turn the power off before working on the machine.
- o To insert or pull out the plug quickly is dangerous.
- o It's necessary to make sure that the power cord or the grounding wire is not exposed on the road, etc. in a manner so as to be dangerous. Make sure that grounding connections are made safely at the position where so specified.
- o Do not use any fuse that does not meet the specified rating.
- o Make complete connections for the IC board and other connecters. Insufficient insertion is very dangerous.

Also, for the IC board circuit inspections, only the logic tone is allowed. The use of a tester is not permitted so be careful in this regard. After confirming that there are no irregularities, turn the power ON.

### 2. PREVENTION OF COUNTERFEITING AND CONVERSION

#### LABELLING

To prevent counterfeits and conversions, the following labels are put on all the SEGA products. When handling such goods, be sure to confirm the labels. They are used to prevent illegal acts such as the unauthorized copying of the products and the printed circuit boards thereof or carrying on business by manufacturing similar merchandise or by converting, selling or using such products or printed circuit boards.

#### ORIGINAL SEAL

The following seal is put on the machines manufactured by SEGA.

#### LICENSE SEAL

The following seal is put on the kits, such as the printed circuit boards, of SEGA products.





#### COPYRIGHT NOTICE

This SEGA product has the copyright notice as follows:

#### © SEGA 1987

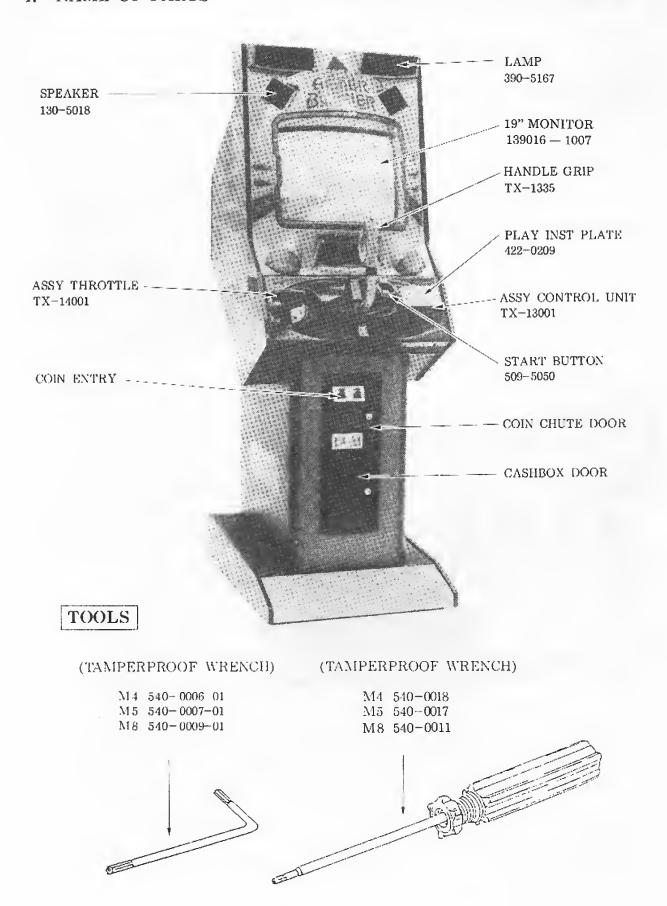
This signifies that this work was disclosed in 1987 and is the property of SEGA ENTERPRISES, LTD.

# 3. PRECAUTIONS CONCERNING THE PLACE OF INSTALLATION

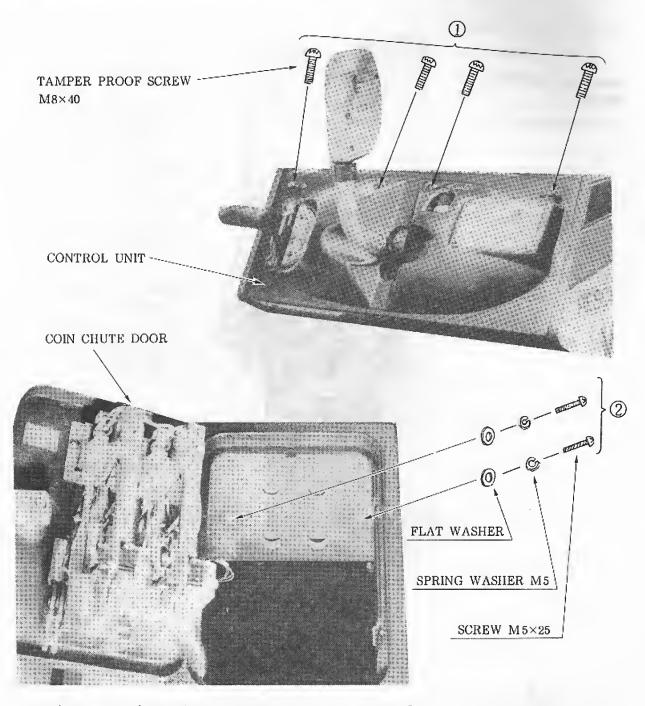
The AFTER BURNER U/R, is an indoor game machine. Absolutely do not install it outside. Even indoors, avoid installing in places mentioned below so as to ensure proper usage:

- o Places subject to rain or water leakage, or condensation due to humidity.
- o In the proximity of an indoor swimming pool and shower.
- o Places subject to direct sunlight.
- o Places subject to heat sources from heating units, etc., or hot air.
- o Vicinity of highly inflammable/volatile chemicals or hazardous matter.
- o Sloped surfaces.
- o Vicinity of anti-disaster facilities such us fire exits and fire extinguishers.
- o Places subject to any type of violent impact.
- o Dusty places.

### 4. NAME OF PARTS



#### 5. OPENING THE CONTROL UNIT



- o When opening the CONTROL UNIT, take off the 4 TAMPERPROOF SCREWS (1), open the COIN CHUTE DOOR, take off the 2 (M5 x 25) SCREWS (2), and the entire CONTROL UNIT will open towards you.
- o Opening the CONTROL UNIT allows for spring replacements, handle centering V.R. adjustments, motor brush replacements and THROTTLE UNIT centering adjustments.

#### 6. HANDLE UNIT ADJUSTMENT

In the test mode, cause the DIAGNOSTIC INPUT DISPLAY to appear on the screen (to select it, push the test switch and move the handle upward and downward).

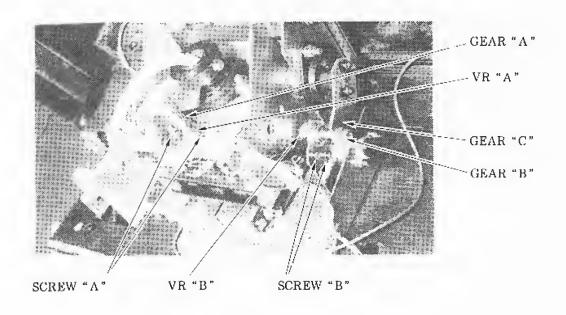
DIAGNOSTIC
INPUT TEST

COIN #1 OFF START OFF
COIN #2 OFF SERVICE OFF

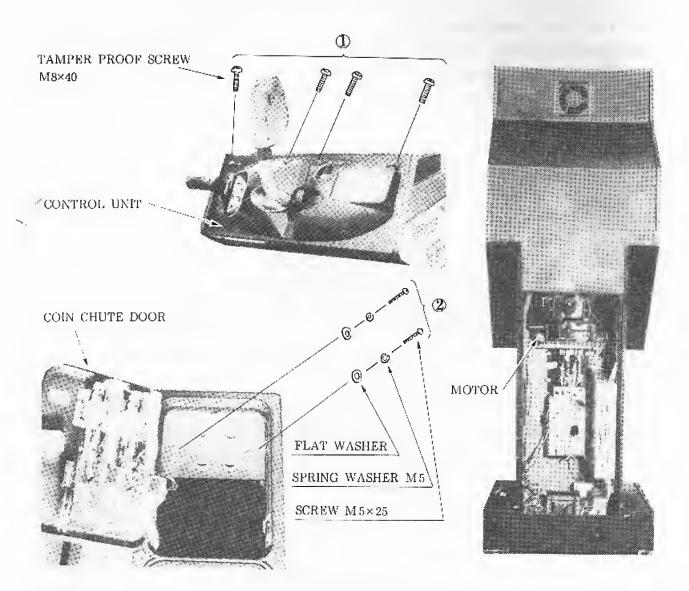
VALCAN OFF
MISSILE OFF

STICK RIGHT LEFT 80H
STICK UP DOWN 80H
SPEED 80H

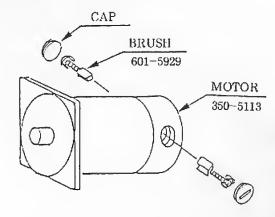
- ① To make VR adjustments in a horizontal direction (RIGHT/LEFT), release the VR "A" bracket's "A" screws and turn gear "A" in a manner so that when the handle grip is in an unoperated status, 80H+2H is obtained. At this time, also make backlash adjustments.
- (2) When making vertical (UP/DOWN) adjustments, while maintain-ing the present inclination of the handle unit, unfasten the gear "C" bracket's "B" screws and fasten the gear "C" bracket when the monitor display shows 80H±2H. For backlash adjustments, loosen the VR "B" bracket.



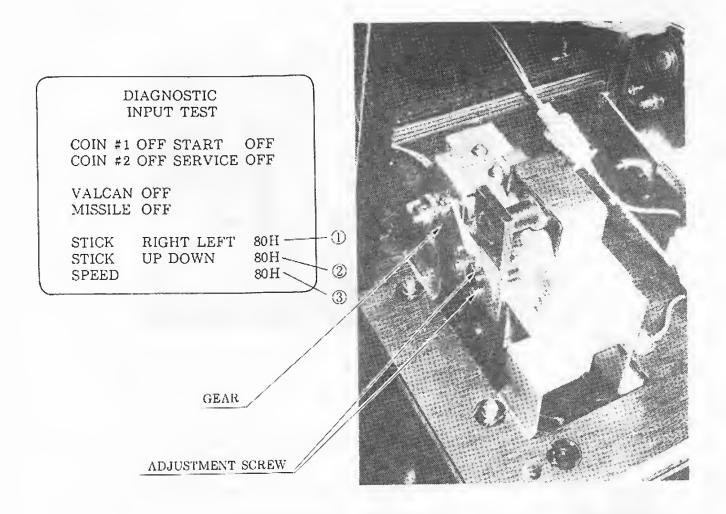
### 7. REPLACING THE MOTOR BRUSHES



To replace the motor brushes, release the cap with a screwdriver, etc. and take out the brushes. Replacement once every 6 months is recommended. Make sure that both brushes are simultaneously replaced.



### 8. THROTTLE UNIT ADJUSTMENT

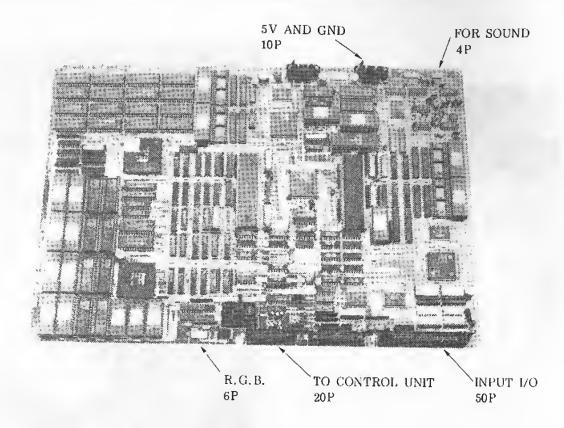


#### ③ SPEED

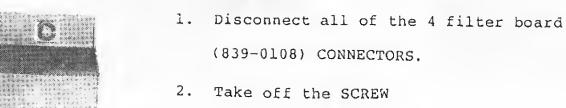
Unfasten the 2 adjustment screws to loosen the volume bracket, making sure that in relation to the gear engagement, the variable value in the test mode is within the allowable adjustment range, and then refasten the adjustment screws.

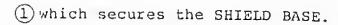
Reference value

### 9. IC BOARD

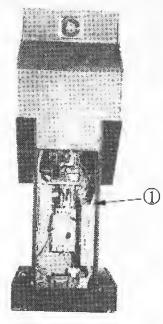


### O HOW TO REMOVE THE IC BOARD





- 3. Completely pull out the SHIELD BASE.
- 4. Take off the 6 S TITE SCREWS which secure the IC BOARD.
- 5. The IC BOARD can be removed by taking off the inserted connectors.



### 10. SERVICE SWITCH FUNCTIONS

The layout as shown below can be viewed by opening the coin chute door.

			SERVICE SWITCH
COIN METER	COIN METER	TEST SWITCH	
			VOLUME CONTROL

#### COMPONENT BRACKET

### INSTRUCTIONS

SERVICE SWITCH	Used for the purpose of
	servicing and increasing the
	credits without registering on
	the meter (this allows you to
	check the game).
TEST SWITCH	For operating this switch, see
	SELF-TESTING.
VOLUME ADJUSTMENT	The volume of the speaker inside
. Obolina Tibo oo Tiliini	the cowl can be adjusted.

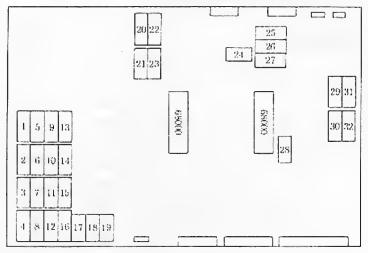
### 11. DIP SWITCH SETTINGS

OP	TION	1	2	3	4	5	6	7	8
1 COIN 1 COIN 1 COIN 5 COINS 6 COINS 7 COINS 2 COINS 3 COINS 4 COINS 2 COINS	1 CREDIT 2 CREDITS 3 CREDITS 1 CREDIT 3 CREDITS	OFF ON OFF ON OFF ON OFF ON	OFF OFF ON OFF OFF ON OFF OFF	OFF OFF OFF ON ON ON OFF OFF	OFF OFF OFF OFF OFF OFF OFF ON	OFF ON OFF ON OFF ON OFF ON	OFF ON ON OFF ON ON OFF OFF	OFF OFF OFF ON ON ON OFF OFF	OFF OFF OFF OFF OFF ON
2 COINS 3 COINS 5 COINS 6 COINS	1 CREDIT 2 CREDITS 3 CREDITS 4 CREDITS	OFF	ON	OFF	ON	OFF	ON	OFF	ON
2 COINS 4 COINS	1 CREDIT 3 CREDITS	ON	ON	OFF	ON	ON	ON	OFF	ON
1 COIN 2 COINS 3 COINS 4 COINS 6 COINS	1 CREDITS 2 CREDITS 3 CREDITS 4 CREDITS 6 CREDITS	01 F	01*1	ON	ON	OFF	OFF	ON	ON
1 COIN 2 COINS 3 COINS 4 COINS	1 CREDIT 2 CREDITS 3 CREDITS 5 CREDITS	ON	OLE	ON	ON	ON	OFF	ON	ON
L COJN 2 COINS	1 CREDIT 3 CREDITS	OF F	ON	ON	ON	OFF	ON	ON	ON
FREE PLAY		ON	ON	ON	ON.	ON	ON	ON	QN

GAME OPTION SWITCH SETTING DIP SW B								
OPTION	1	2	3	4	5	6	7	8
MOVING DX CABINET MOVING STD TYPE UP RIGHT 1 UP RIGHT 2	OFF ON OFF ON	OFF OFF ON ON						
THROTTLE WITH LEVER WITHOUT			OFF ON					
SHIPS PER 3 PLAYERS CREDIT 4 PLAYERS				OFF ON				
SHIP NO INCREASE YES					OFF ON			
CONTINUE NO PLAY YES						OFF ON		
NORMAL GAME EASY DIFFICULTY HARD HARDEST							OFF ON OFF ON	OFF OFF ON ON

### 12. EPROM/MASK ROM LOCATIONS

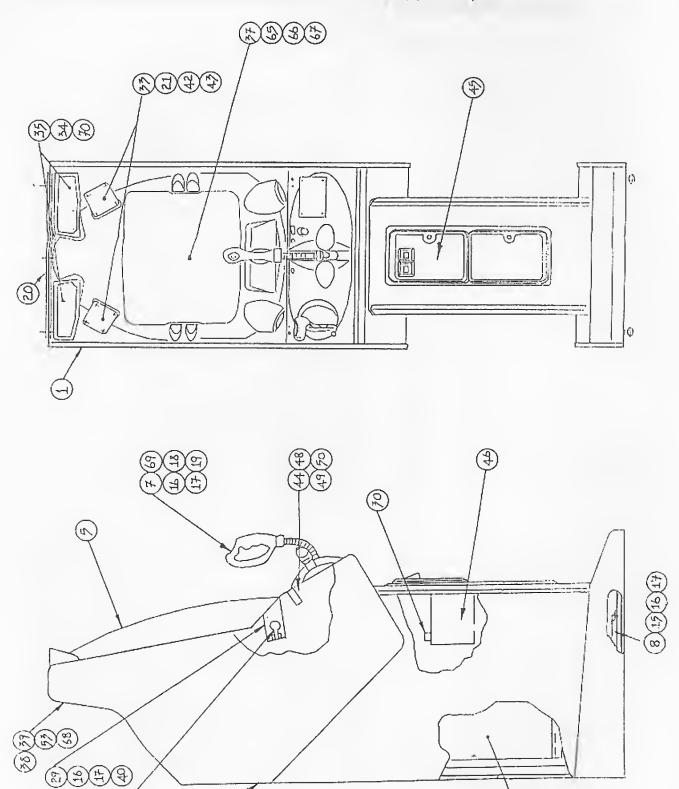
GAME BD AFTER BURNER 834-6335-01



	IC LOCATION	NUMBER	MAIN WORK
t	IC 93	EPR - 11098	
2	IC 97	EPR-11099	
3	IC 101	EPR - 11100	OBJECT
4	IC 105	EPR- 11101	(CHARACTER &
5	IC 92	EPR - 11094	SCENE SCENERY)
6	IC 96	EPR- 11095	
7	IC 100	EPR- 11096	
8	IC 104	EPR- 11097	
9	IC 91	MPR 10933	
10	IC 95	MPR -10935	
11	IC 99	MPR-10937	
12	IC 103	MPR-10939	
13	IC 90	MPR-10932	
14	IC 94	MPR = 10934	
15	IC 98	MPR-10936	
16	IC 102	MPR - 10938	
17	IC 154	EPR - 11089	10151 (AVAID (AL )
18	IC 153	EPR - 11088	FIX SCROLL
19	IC 152	EPR- 11087	CHARACTER
20	IC 58	EPR - 11092	
21	IC 63	EPR - 11093	MAIN PROGRAM
22	IC 57	EPR 10950	MAIN PROGRAM
23	IC 62	EPR-10951	
24	IC 17	EPR-10923	SOUND PROGRAM
25	IC 11	MPR 10930	
26	IC 12	MPR - 10931	SOUND DATA
27	IC 13	EPR-10929	
28	1C 40	EPR-10922	ROAD
29	IC 21		
30	1C 30	EPR-11090	SUBPROGRAM
31	IC 20	EPR-11091	002110011111
32	IC 29		

### 13. PARTS LIST

## 1. FINAL ASSY AFTER BURNER U/R (TX - 00001 AT) (D - 1/2)



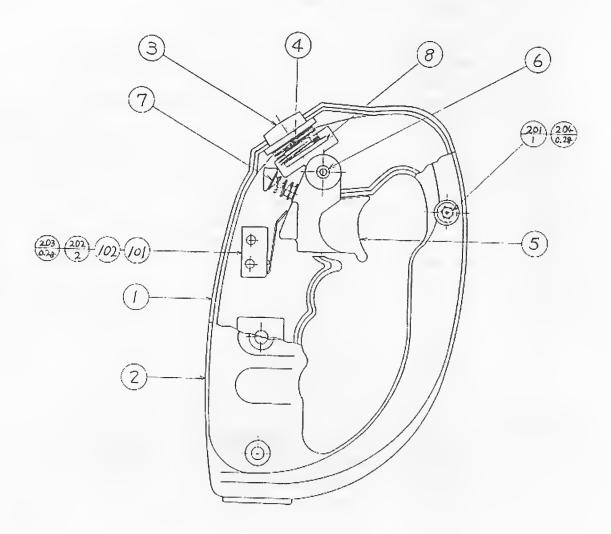
**⊕**(₹)

EEE 6

### 1. FINAL ASSY AFTER BURNER U/R (TX - 00001 AT) (D - 2/2)

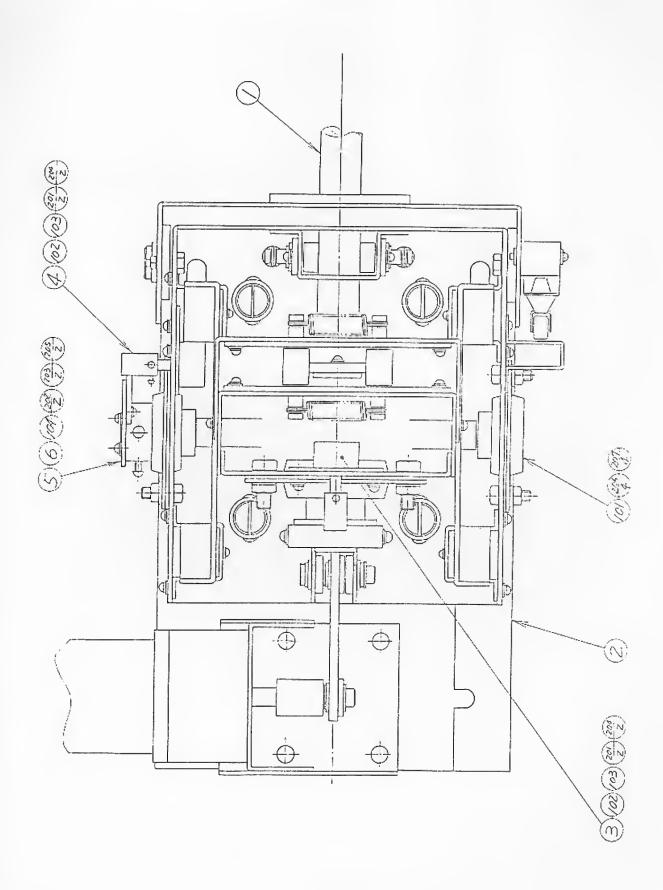
ITEM NO.	PART NO.	DESCRIPTION
1	A044586—51	ASSY CABINET U/R
3	420—5798—01AT	OWNER'S MANUAL AFTER BURNER U/R ENG
ñ	TX-1616	FRONT PANEL W/STICKER
6	A044620—51	ASSY GAME BOARD AFTER BURNER EXPORT
7	TX-13001	ASSY CONTROL UNIT U/R
8	TX-40001AT	ASSY PWR SPLY U/R
9	117—5123	NAME PLATE ELEC SPEC USA
10	421-6709	STICKER SERVICE INSTR ENGLISH
11	421-6594	STICKER SERIAL NO INFO
12	421-5800-60	ORIGINAL SEAL AFTER BURNER
13	421-6929-01	ADJUST INSTR SHEET TX EXPORT
15	000-0530	M SCR PH M5 x 30
16	069-0001	FLT WSHR $5.5$ — $20 \times 1.6$
17	061-0005	SPRING WSHR M5
18	008-0516	TMP PRF SCR TH M5 x 16
20	000-0520	SCR TH M5 x 20
19	029-0099	TMP PRF SCR BH M8 x 40
69	000-0525	M SCR PH M5 x 25
SPARES KIT		
	540-0009-01	WRENCH FOR TMP SCR M8
	540—0007—01	WRENCII FOR TMP SCR M5
	540-0006-01	WRENCH FOR TMP SCR M4
	390-5167	LAMP 110V 30W
	220-5130	VOL CONT B—5K OHM
	601-5929	MOTOR BRUSH
	TX-1317	EXT SPRING
	TX-1330	EXT SPRING
	TX-1423	EXT SPRING

# 2 ASSY HANDLE GRIP (TX - 1335)



ITEM NO.	PART NO.	DESCRIPTION
1	TX=1336	HANDLE GRIP LEFT
2	TX-1337	HANDLE GRIP RIGHT
3	TX-1338	BUTTON
4	TX-1339	COMPRESSION SPRING
5	CD-2041	TRIGGER
6	CD-2042	SHAFT TRIGGER
7	125-0011	COMPRESSION SPRING
8	839-0087	SW BOARD
9	600-5521	WIRE HARN HANDLE GRIP
10	211-0041	CONN PIN AMP
101	509-0058	SWITCH MICRO TYPE (MULON SL-220)
102	530-0028	THERMO-SHRINK TUBE HISHILITE TRANSPARENT 4mm
201	0290052	TMP PRF SCR PH M5×10
202	029-0134	M SCR PH M2×10
203	244-044	GLUE SCR LOCK
204	244-106	LOCTITE #271

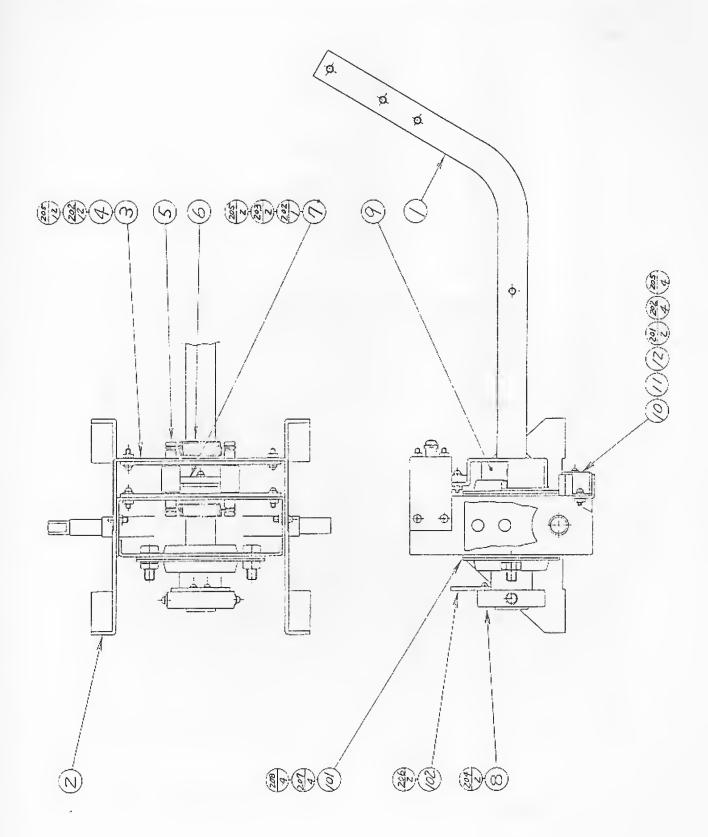
# 3 ASSY CONTROLLER (TX - 1350) (D - 1/2)



# $\bigcirc$ ASSY CONTROLLER (TX - 1350) (D - 2/2)

ITEM NO.	PART NO.	DESCRIPTION
1	TX-1351	SUB ASSY CONTROLLER
2	TX-1352	ASSY SHOCK MECHANISM
3	TX-1318	VR BRACKET A
4	TX 1334	VR BRACKET B
5	TX-1307	ADJUST PLATE
$\epsilon_{i}$	MX 2017	ADJUSTER
101	100+ 5042	BEARING /12
102	220 - 5130	VOL CONT B. 5K OHM
103	601 5410	GEAR 45, 46
104	601 - 5423	GEAR 176
305	603 + 5493	GEAR 20, 7.15
301	000 0408 FS	M SCR PH W/FS M4×8
202	000 0008 S	M SCR PH W/S M4×8
203	000 0412- FS	M SCR PH W/FS M4×12
204	028 0005	SET SCR PH SPECIAL Maxs
205	028 0021	SET SCR PH SPECIAL MAXIG
206	061 (8)06	SPR WSRR M6
207	054-0006	U NUT M6

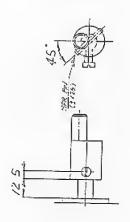
## 4 SUB ASSY CONTROLLER (TX - 1351) (D-1/2)

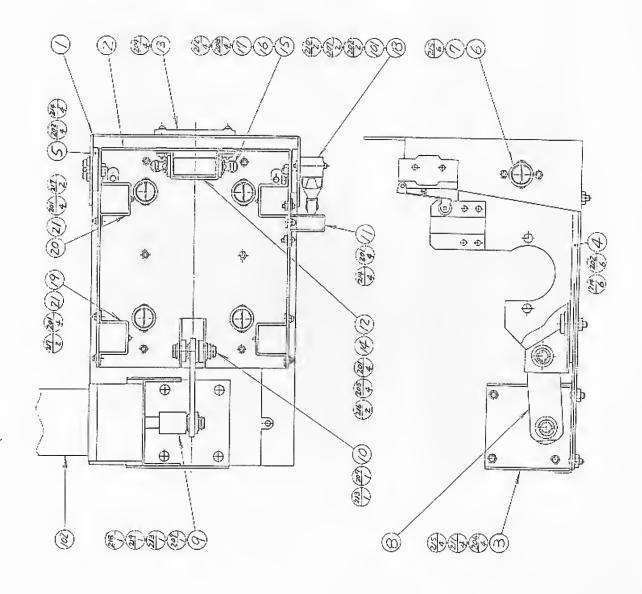


# 4 SUB ASSY CONTROLLER (TX - 1351) (D - 2/2)

ITEM NO.	PART NO.	DESCRIPTION
1	TX-1355	HANDLE SHAFT U
2	TX-1313X	MECHANISM BASE
3	TX-1314	FRONT COVER
4	TX-1315	PLATE
5	TX-1316	SHAFT A
6	TX-1317	EXT SPRING
7	TX-1319	CENTER PLATE
8	TX-1320	ADJUSTER
9	TX - 1321	FRONT SPACER
10	TX-1322	BUMPER HOLDER L
11	TX-1323	BUMPER HOLDER R
12	TX-1371	BUMPER C
13	TX-1373	SPACER A
101	100-5043	BEARING Ø25
102	601-5942	GEAR 1/5, 1/4
201	000-0305-S	M SCR PH W/S M3×5
202	000-0412-FS	M SCR PH W/FS M4×12
203	000-0416-FS	M SCR PH W/FS M4×16
204	000-0520-FS	M SCR PH W/FS M5×20
205	054-0004	U NUT M4
206	000-0408-S	M SCR PH W/S M4×8
207	061-0008	SPR WSHR M8
208	050-0008	HEX NUT M8

# $\bigcirc$ ASSY SHOCK MECHANISM (TX - 1352) (D - 1/2)

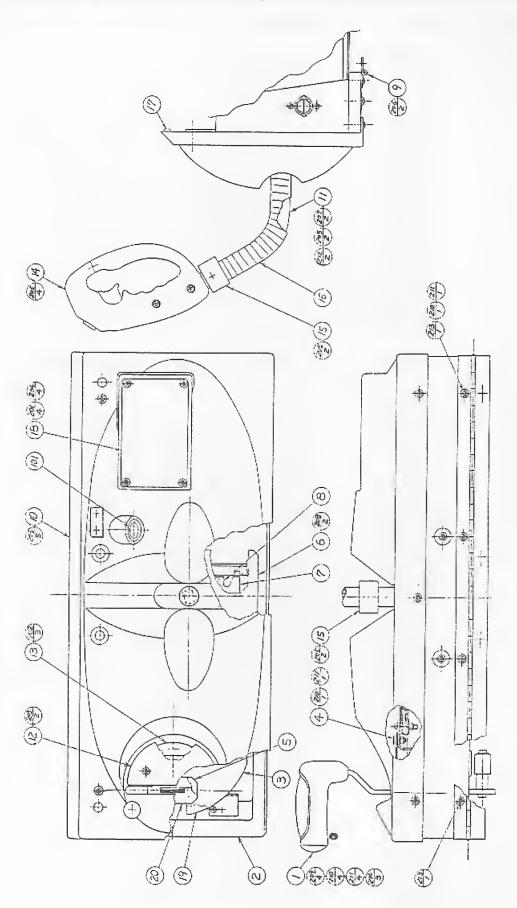




# 5 ASSY SHOCK MECHANISM (TX - 1352) (D - 2/2)

ITEM NO.	PART NO.	DESCRIPTION
1	TX-1353	MAIN BASE
2	TX-1354	MOVING BASE
3	TX-1357	MOTOR BRACKET
4	TX 1358	SLIDE PLATE BOTTOM
5	TX-1359	SLIDE PLATE SIDE
6	TX-1360	GUIDE WASHER
7	TX-1361	SHOULDER SCREW
8	TX-1362	ROD
9	TX-1363	CAM
10	TX 1364	SHAFT
11	TX-1365	SWITCH BRACKET
12	TX-1325	SPRING BRACKET
13	TX 1326	FRONT GUIDE
14	TX-1327	SIDE PLATE
15	TX 1328	SHAFT B
16	TX-1329	PIPE
17	TX-1330	EXT SPRING
18	KR-3023	LIMIT SW NUT PLATE
19	TX-1331	HOLDER L
20	TX-1332	HOLDER R
21	TX-1372	
22		BUMPER D SPACER B
101	TX -1374 5095199	–
102	350-5113	SW MICRO TYPE
102	Per	MOTOR DC 45V
201	000-0412-FS	M SCR PH W/FS M4×12
202	001-0414	M SCR FH M4×14
203	030-0430	HEX BLT M4×30
204	000-0510-FS	M SCR PH W/FS M5×10
205	001-0512	M SCR FH M5×12
206	029-0035	M SCR PH M6×12
207	060-0004	FLT WSHR M4
208	060-0008	FLT WSHR M8
209	060 0010	FLT WSHR M10
210	061-0004	SPR WSHR M4
211	061-0006	SPR WSHR M6
212	065 - 0006	E RING 6mm
213	045-0022	COT PIN 2,5×20
214	054 -0004	U NUT M4
215	054-0006	U NUT M6
216	054 0005	U NUT M5
217	000-0305-S	M SCR PH W/S M3×5
218	028-0012	SET SCR CHEESE HEAD SPECIAL M5×12
219	045-0014	SPR PIN UNBR 3×26
220	090-0013	GREASE
221	090~0012	SCREW LOCK

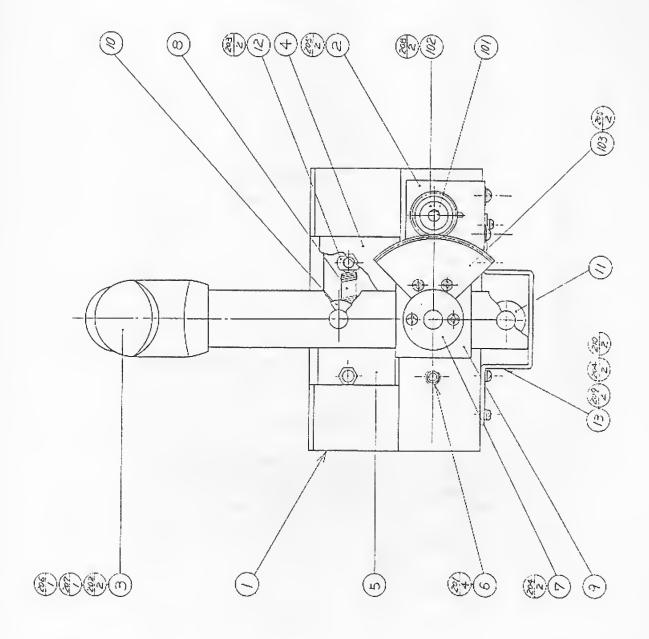
# 6 ASSY CONTROL UNIT U/R (TX-13001) (D-1/2)



# 6. ASSY CONTROL UNIT U/R (TX-13001) (D-2/2)

ITEM NO.	PART NO.	DESCRIPTION
1	TX-14001	ASSY THROTTLE U/R
2	TX-1341	CON PNL BASE
3	TX-1342	FLAG PLATE
4	TX 1343	SHLDER SCREW
5	TX-1344	COVER B
6	TX-1345	_GUIDE PLATE
7	TX-1346	SLIDE PLATE A
8	TX-1347	SLIDE PLATE B
9	TX-1366	HINGE 590
10	TX-1348	CONTROL PANEL
11	TX-1350	ASSY CONTROLLER
12	TX-1349	THROTTLE COVER
13	TX-1367	COVER HOLDER
14	TX-1335	ASSY HANDLE GRIP
15	TX 1310	HOLDER A
16	TX-1356	PROTECT TUBE U
17	IIN-1069	RUBBER CUSHION
18	422 - 0209	PLAY INSTR PLATE U/R ENG
19	TX-1369	FLAG
20	TX-1370	COVER A
101	509-5050	PUSH BUTTON SWITCH 1T YELLOW W/LAMP
201	059 -0014	WELL NUT M4
202	001-0406	M SCR FH M4×6
203	008 0408	TMP PRF SCR TH M4×8
204	008-0416	TMP PRF SCR TH M4×16
205	029-0052	TMP PRF SCR PH M5×10
206	008-0516	TMP PRF SCR TH M5×16
207	008 - 0520	TMP PRF SCR TH M5×20
208	000-0516-FS	M SCR PH W/FS M5×16
209	000 -0525	M SCR PH M5×25
210	061-0005	SPR WSHR M5
211	054 0005	U-NUT M5
212	069-0064	FLT WSHR BLK 5.5-20×1.6
213	008-0525	TMP PRF SCR TH M5×25
214	005 3113-F	W SCR PH W/F 3.1×13
	090-0012	SCREW LOCK
301	SGB-3842 · 15	WIRE HARN DC MOTOR
	211-0043	CONN PLUG AMP 2P WHITE
	211-0041	CONN PIN AMP
	2090032	CONN CLOSED END
	601-0460	PLASTIC TIE BELT 85mm
302	SGB-3842-17	WIRE HARN LIMIT SW
	211-0096	CONN PLUG AMP 2P YELLOW
	211 = 0041	CONN PIN AMP
	211-0167	TERM LUG RND ID 5
	601-0460	PLASTIC TIE BELT 85mm
303	SGB-3824-21	WIRE HARN CONTROL UNIT
	211-0104	CONN PLUG AMP 6P ORANGE
	211-0101	CONN PLUG AMP 4P ORANGE
	211-0041	CONN PIN AMP
	280-0472	FASTON RCPT 110
	209-0023	CONN CLOSED END
	280-5008	CORD CLAMP Ø21
	601-0460	PLASTIC TIE BELT 85mm
	310-5002	HISI TUBE EVA TRS 2.5mm×0.2
		Thoi Tobia Evy I ha Zammxii y

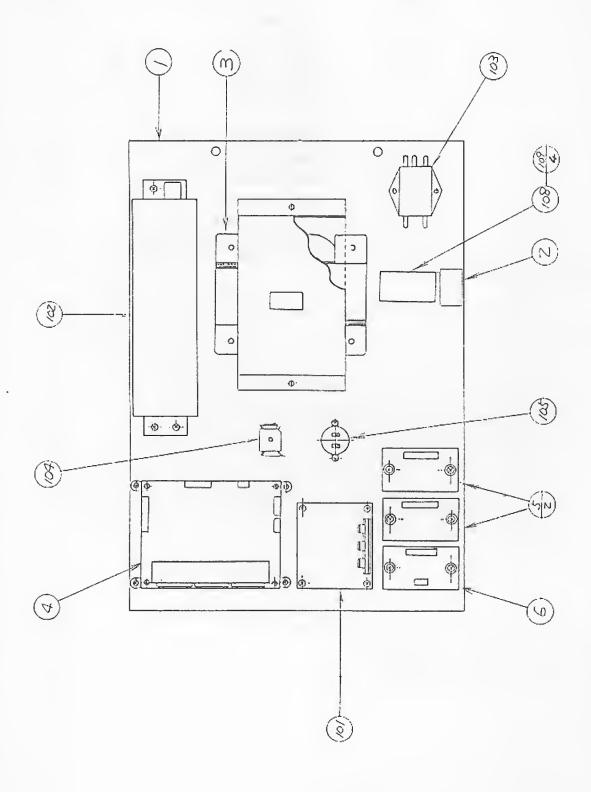
### 7. ASSY THROTTLE U/R (TX-14001) (D-1/2)



## 7. ASSY THROTTLE U/R (TX-14001) (D-2/2)

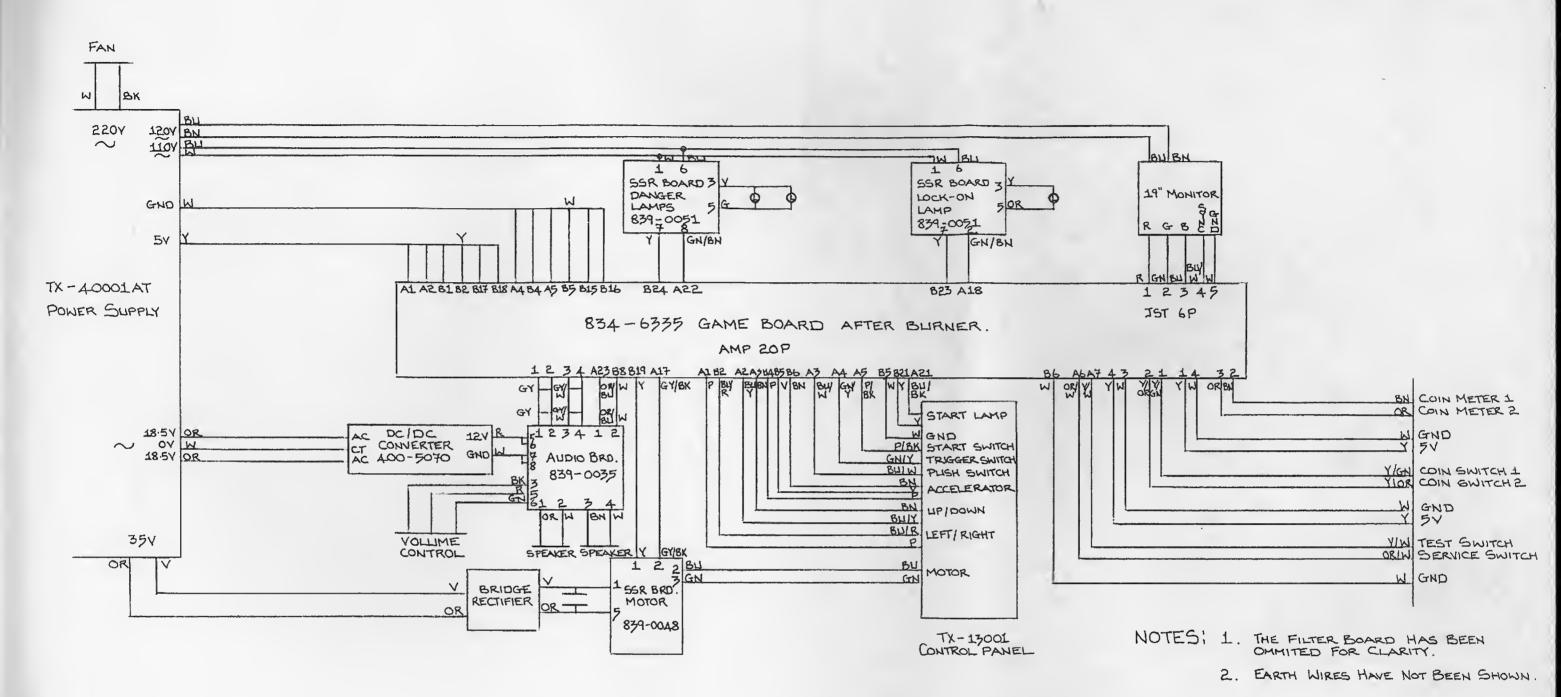
ITEM NO.	PART NO.	DESCRIPTION
1	TX-1418	THROTTLE BASE
2	TX-1419	VR BRACKET
3	TX-1432	THROTTLE LEVER U/R
4	TX-1403	SWING ARM A
5	TX-1404	SWING ARM B
6	TX-1405	SHAFT SWING ARM
7	TX-1406	GUIDE RING
8	TX-1423	EXT SPRING
9	TX-1003	ADJUST PLATE
10	CY-2307	ROLLER
11	KR-1303	STOPPER PLATE
12	TX-1422	STUD
13	TX-1430	STOPPER BRACKET U/R
101	220-5130	VOL CONT B-5K OHM
102	601-5424	GEAR 30
103	601-5863	GEAR 1/4
201	065-0004	E RING 4mm
202	065-0008	E RING 8mm
203	054-0006	U-NUT M6
204	000-0414-S	M SCR PH W/S M4×14
205	000-0408-FS	M SCR PH W/FS M4×8
206	060-0010	FLT WSHR M10
207	045-0022	COT PIN 2.5×20
208	028-0014	SET SCR HEX SKT CP UNBR M4×4
209	000-0406-S	M SCR PH W/S M4×6
210	054-0004	U-NUT M4
	244-117	GREASE
	244-116	SCREW LOCK
301	SGB-3824-22	WIRE HARN THROTTLE
	211-0099	CONN PLUG AMP 3P YELLOW
	211-0041	CONN PIN AMP
	601 0460	PLASTIC TIE BELT 85mm

## 8. ASSY PWR SPLY U/R (TX-40001 AT) (D-1/2)

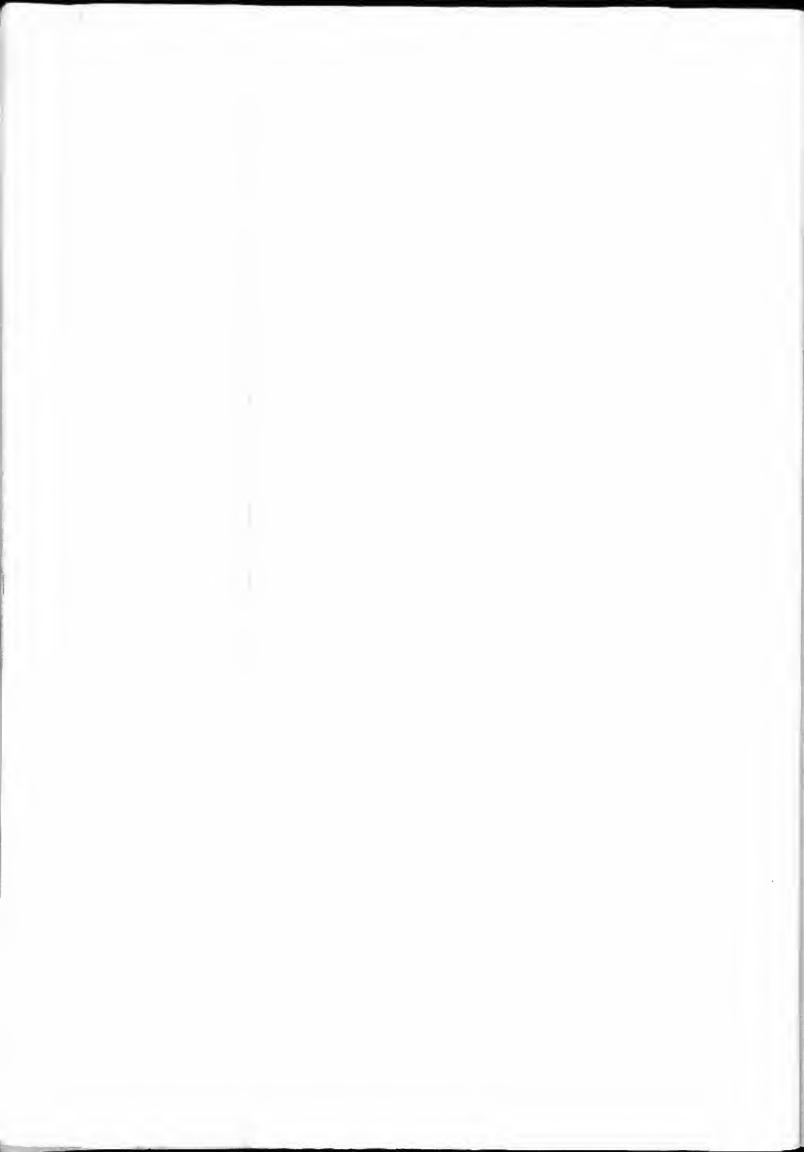


# 8. ASSY PWR SPLY U/R (TX-40001 AT) (D-2/2)

ITEM NO.	PART NO.	DESCRIPTION
1	A04461551	BASE
2	043622-51	STICKER FUSE INSTR
3	560-5115	PWR XFMR
4	839-0035-01	PWR AMP DC 12V 10W
5	839-0051	SSR BD
6	839-0048	SSR BD DC MOTOR
101	400—5070	DC/DC CONVERTER 12V 5A
102	149010—101	SW REGU 240V +5V 7A
103	A042384—()1	NOISE FILTER AC 250V
104	481—0157	DIODE BRIDGE S5VB 20
105	150-0173	CAP E 4700MF 50V C-TYPE
108	179225—2205	FU HLDER 5 POSITION
109	46-2012002	FUSE 2A SLOW BLOW
201	000-0516-FS	M SCR PH W/FS M5 x 16



WIRING DIAGRAM AFTER BURNER





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